

Everything You Know is Wrong

Jim Waldo




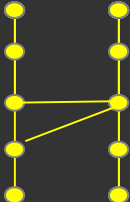
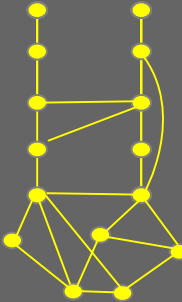
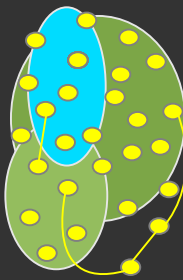
Distinguished Engineer

Sun Microsystems, Inc.





Platform Evolution

	Client-Server	3/N-Tier	Net Apps	Net Services	Next	After that
Catch Phrase	The Network Is the computer	Objects	Legacy to the Web	The Computer Is the Network	Networking at the Edge	Network of Things
System Collections Components						
Scale	100s	1000s	1000000s	10000000s	100000000s	1000000000s
When/Peak	1984/1987	1990/1993	1996/1999	2001/2003	1998/2004	2004/2007
Leaf Protocol(s)	X	X	+HTTP (+JVM)+XML, Portal	+RMI	Unknown	
Directory(s)	NIS, NIS+	+ CDS	+ LDAP (*)	+UDDI	+ Jini	+ ?
Session	RPC, XDR	+CORBA	+CORBA, RMI	+ SOAP, XML	+ RMI/Jini	+ ?
Schematic						



Deutsch's 7 Fallacies of Networking

- " The network is reliable
- " Latency is zero
- " Bandwidth is infinite
- " The network is secure
- " Topology doesn't change
- " *There is one administrator*
- " Transport cost is zero

New Challenges

- Computing without people
 - How will programs find and use programs?
- Security in a networked world
 - Social as much as technical
- Dealing with change
 - Bootstrapping, Evolving
 - Versioning
- Embedded systems are different

Promising Directions

- Mobile objects and virtual machines
 - Raise the level of abstraction
 - Allow interface/implementation distinction
- Proximity-based security
 - If you are close, I can trust you (some)
- Self-administering systems
 - Automatic joining
 - Self-healing



We Need *Fundamental* Research

- Question long-held beliefs
 - What is security
 - How are networks assembled
 - What is a computer
- Become more adventurous
 - Fundamental research often fails
 - Failure is an interesting result